

TITLE: "Irrigation Scheduling, Freeze Warning and Soil Salinity Detecting"

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TAPES:

The following conical tapes cover the study area in Cameron County:

SKYLAB IV/EREP DIGITAL TAPES

DDC NUMBER:	OUTPUT TAPE	DPAR NUMBER:
34-12317	930354	S192-249-003-061-51-2
34-12321	930355	S192-249-003-061-51-2

Two line-straightened tapes (OUTPUT TAPES 930357 and 930358) were sent by mistake, and they will be replaced with appropriate conical tapes.

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STATEMENT OF PROGRESS

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Cameron County

Bendix 24-channel multispectral scanner (MSS) data recorded on computer compatible tape (CCT) for the saline soil study in Cameron County, described in Weslaco SKYLAB MPR #9, dated September, 1974, were studied by A. J. Richardson et al. for scan angle reflectance effects across the aircraft flight line on MSS data. These data were collected at 5,700 ft and 16,000 ft on December 11, 1973. Exact MSS data coverage at both altitudes is described in Weslaco SKYLAB MPR #11, dated November, 1974. Scan angle reflectance effects are a function of scanner view angle, sun elevation, and sun azimuth.

The MSS data for CCT 1 (16,000 ft) and CCT 12 (5,700 ft) were summed for 224 scan line records in the direction of the aircraft flight line (north-south direction) for MSS band 10 for each of the 174 scan line samples, recorded on the summary CCT, across the aircraft flight line (east-west direction). The mean digital value for each of the 174 scan line samples was determined ( $N = 224$ ). Every eighth scan line mean digital value ( $N = 20$ ) were plotted for CCT 1 and CCT 12 as shown in Figure 1A and 1B, respectively. This averaging technique assumes (Landgrebe, David. 1972. "Data Processing II: Advancements in Large-Scale Data Processing Systems for Remote Sensing," 4th Annual Earth Resources Program Review, II:51-1 to 51-31, January 17-21, 1972) that if sufficient data are summed then reflectance effects due to individual surface cover materials will be averaged out leaving only the reflectance effect due to scan angle variation across the flight line.

Scan angle reflectance effects were strongest for the MSS data collected at 5,700 ft (Figure 1B) as can be seen from the steepness of the scan line reflectance (digital counts) curve and the strong multiple linear correlation ( $R = 0.92$ ; second degree polynomial) between MSS digital counts and scan line sample numbers. Even though the scan angle reflectance effects were relatively weaker at 16,000 ft as compared to 5,700 ft, as evidenced by the relatively shallow curve (Figure 1A) and smaller multiple linear correlation ( $R = 0.74$ ; second degree polynomial), it was felt that scan angle reflectance effects at both altitudes were too strong to ignore. Rather than develop new programs to pre-process all aircraft tapes to remove angular reflectance effects from each channel, it was decided to simply restrict saline soil studies to scan line sample numbers where the curves are reasonably straight and level (scan line sample numbers 17 to 115) for both altitudes.

SKYLAB 13-channel MSS.--The six SKYLAB IV/EREP CCT's that were received December 17, 1974, (Weslaco SKYLAB MPR #12, dated December, 1974) were examined to determine the extent of SKYLAB coverage relative to the Cameron County saline soil study area. It was found that two of the conical scan CCT's, with EREP tape identification numbers 930354 and 930355, provided the necessary saline soil study area coverage. Approximate coverage of these two CCT's (dashed lines) relative to the Bendix MSS flight line is shown in Figure 2. Future processing will include selecting MSS digital data from these two SKYLAB CCT's corresponding to the saline soil study area and merging these data together on one secondary tape for final analysis.

#### Starr County

Density readings relating to each of the seven range sites for each of six films (SKYLAB MPR #12, dated December, 1974) are being statistically analyzed through the efforts of A. H. Gerbermann, J. A. Cuellar, and J. F. Everitt et al. The objective is to relate density readings to salinity levels through the light reflective characteristics of the types of vegetation that are growing on the seven range sites. A summary of the methods and results for Starr County will be given in the February, 1975 Progress Report.

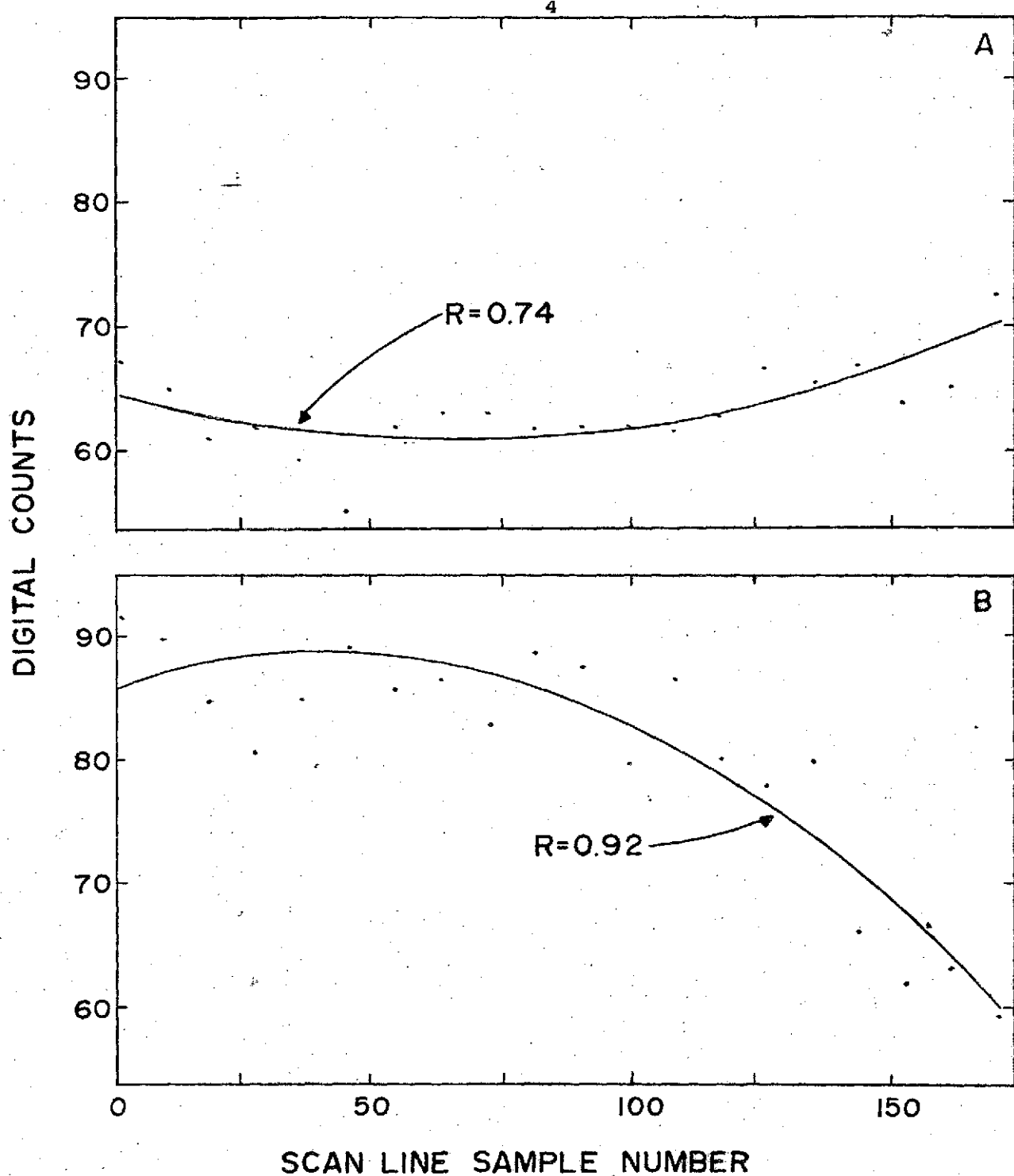


Figure 1A and 1B--Reflectance (in digital counts) variation plotted (points) as a function of scanner view angle and sun angle (scan line sample number) for Bendix MSS band 10 of 24 on December 11, 1973, at 10:00 AM CDT. A second degree polynomial (smooth line) is shown fitted to the data with multiple linear correlation  $R = 0.74$  (A) and  $R = 0.92$  (B). Scan line sample numbers 0, 88, and 175 correspond to the west, nadir, and east position, respectively, of the scanner view angle at 16,000 ft (A) and east, nadir, and west position, respectively, at 5,700 ft (B).

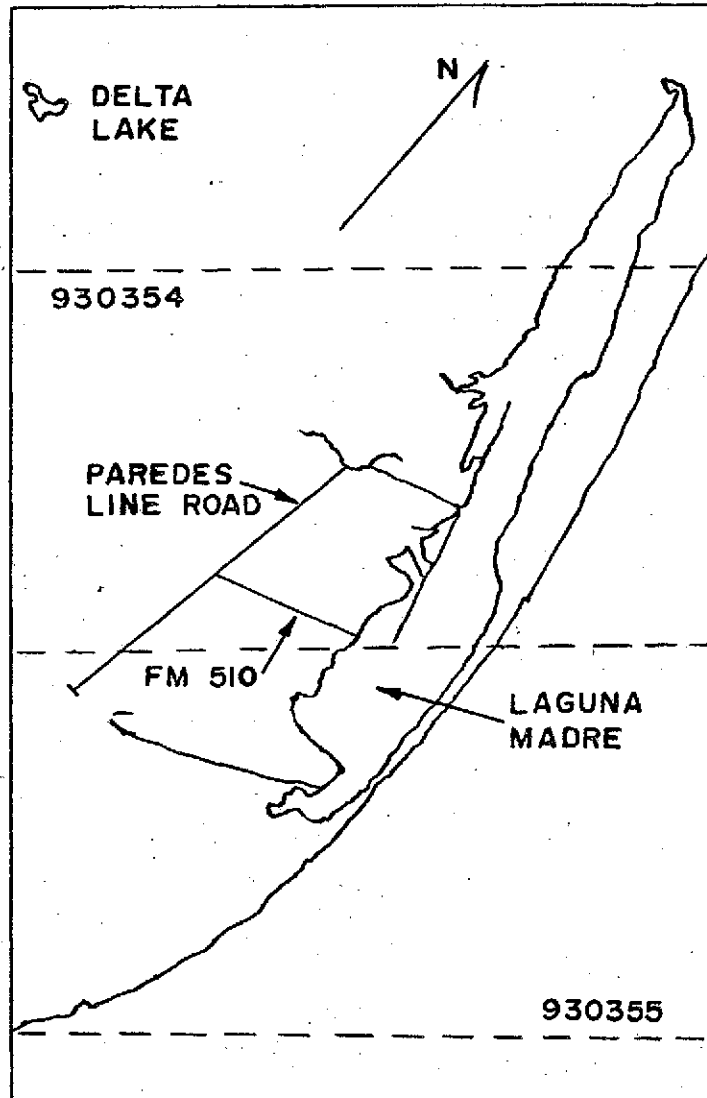


Figure 2

--SKYLAB 13-channel MSS computer compatible tape (CCT) coverage of saline soil study area defined by Paredes Line Road and Farm Road 510 on December 5, 1973, at 269 statute miles altitude. Two of six SKYLAB CCT's provided the approximate coverage as indicated by the two dashed lines.

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The subject PROGRESS REPORT (January, 1975) is attached in accordance  
with contract provisions and TF6-73-9-06.

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